Chapter 4
Treatment BMPs

Contents

1.0 Overview

This chapter contains guidance and design requirements for structural Best Management Practices (BMPs) for new development and significant redevelopment as defined in the following sections. As discussed in Chapter 2, BMPs provide treatment through a variety of hydrologic, physical, biological, and chemical processes. The functions provided by BMPs may include volume reduction, treatment and slow release of the water quality capture volume (WQCV), and combined water quality/flood detention. Ideally, site designs will include a variety of source control and treatment BMPs combined in a "treatment train" that controls pollutants at their sources, reduces runoff, and treats pollutants in runoff. Sites that are well designed for treatment of urban runoff will include all of the steps in the Four Step Process discussed in Chapter 1. The minimum measures required for development projects to satisfy the City's MS4 permit requirements are described in Section 4.1 of Chapter 1.This chapter hereby incorporates by reference all criteria presented in the current version of the Urban Storm Drainage Criteria Manual (USDCM), Volume 3, Best Management Practices, Chapter 4 Treatment BMPs for purposes of design and implementation, except as modified herein. Detailed descriptions, sizing and design criteria, and design procedures for these BMPs are provided in the USDCM, V3 Treatment BMP Fact Sheets.

Runoff from all impervious surfaces of a site must flow through a properly designed installation of one or more of the WQCV BMPs presented in this Chapter. All new and significant redevelopment with construction activities that disturb greater than 1 acre must assess the existing and planned water quality treatment for the drainage basin in which the development lies. For basins that have been master planned to include regional or subregional water quality BMPs that are designed to treat the WQCV fo the entire drainage area upstream, Steps 1, 3, and 4 will be required to reduce site runoff, stabilize the receiving water drainageway, and implement site specific BMPs respectively. New and redevelopment within basins in which regional or sub-regional treatment of the WQCV is not provided must also implement Step 2 of the Four Step Process to ensure treatment of the WQCV for the site.

Modifications to the BMP designs in this manual must be approved through the variance process described in Chapter 1. Modifications will only be approved with proper justification for the design change. This includes documentation showing that the modified design will achieve the same or better water quality benefit as the design shown in the manual. Missing design elements of treatment BMPs can only be allowed if other adjustments are made to provide for additional water quality treatment through other measures (for example, treatment train with other onsite BMPs).

Alternate BMPs may be considered, but they must have equivalent or better functional requirements of the WQCV BMPs as to WQCV, design requirements for timed release outlet structures, and drain times (see Section 5 below).

2.0 Definition of New Development and Redevelopment/BMP Requirements

The MS4 permit requires that a program must be implemented and enforced by the MS4 permittee to address post-construction stormwater runoff from new development and redevelopment projects for which *construction* activities disturb greater than or equal to one acres, including projects less than one acre that are part of a larger common plan of development or sale that discharge into the MS4. Chapter 7 further defines common plan of development.

For the purpose of defining when treatment water quality Best Management Practices are required, "New Development and Redevelopment" are defined as:

- All sites that include total development/redevelopment areas for which construction activities disturb greater than or equal to one (1) acre, including projects less than one acre that are part of a larger common plan of development or sale that discharge to the MS4. WQCV shall be provided for the total site or individual lots/parcels. Other treatment BMPs may also be required as appropriate.
- All other sites that do not meet the above requirements may be required to provide treatment water quality BMPs, if significant water quality impacts are anticipated or observed as a result of development/redevelopment of the site.

The intent of treatment water quality BMPs is that they be placed prior to the stormwater runoff being discharged to State Waters. However, as described in Chapter 1, downstream BMPs (such as regional ponds) may also be acceptable if certain conditions are met. All new and significant redevelopment with construction activities that disturb greater than 1 acre must assess the existing and planned water quality treatment for their specific drainage basin based on the following procedures:

1) Review the DBPS and/or master planning document in effect for the impacted drainage basin, and determine if regional or sub-regional WQCV is master planned to serve the area being developed.

2) If the master planned water quality features have been designed and constructed to treat the WQCV from the entire drainage area upstream, including the area being developed, then only Steps 1, 3, and 4 of the Four Step Process shall be implemented as long as the water quality feature serving the area to be developed is publicly owned and maintained.

3) If the master planned water quality features are not yet designed and constructed, then Steps 1-4 of the Four Step Process shall be implemented. Options for provision of BMPs to treat the WQCV for the development site include developer participation in the design and construction of the master planned regional or sub-regional BMP, design and construction of an on-site BMP, or other approved alternative that meets the requirements of Step 2. On-ste BMPs require the applicant to ensure long-ter operation and maintenance through the execution of a BMP Maintenance Agreement with the City.

3.0 Submittals

The requirements of this chapter shall be incorporated into existing submittals for review and acceptance including Erosion and Stormwater Quality Control Plan (see Chapter 7), Preliminary/Final Drainage Reports (see Subdivision Policy Manual) and construction plans, or as otherwise specified by the MS4 Permittee (in Colorado Springs the City Engineer is delegated authority to implement the MS4 permit). It is recommended that discussions and collaboration regarding treatment BMPs occur early in each project between the developer's planner and engineer and MS4 permittee staff.

Also note that percolation tests required for full infiltration treatment BMPs need to occur at the location of the BMP and not at other locations on the site. This is due to changing soil types and conditions that could exist at the site. This information must be provided to the MS4 permittee in order for the MS4 permittee to approve the use of a full infiltration treatment BMP.

4.0 Underground BMPs

The use of underground, vault type BMPs is generally prohibited; however, they may be allowed on a case by case basis using the variance procedures described in Chapter 1, Volume 1 of this Manual. Due to space constraints underground BMPs are allowed in select locations as follows: Public road improvement projects where limited space is available for Treatment BMPs and in redevelopment projects in the downtown core (from Boulder Street to Vermijo Street, and Cascade Avenue to Weber

Street). Private underground stormwater BMPs are allowed in this downtown area provided they keep captured organic material dry to mitigate leaching of nutrients from leaves and grass clippings, and have an approved monitoring, inspection, and maintenance program. For private BMPs, a recorded maintenance agreement is required. Public Capital Improvement projects, such as PPRTA projects, are required to have approval from the Public Works Director in order to use these products because this department is responsible for their long term maintenance and effectiveness. Maintenance plans are also required for the public underground BMPs.

Criteria used to select the appropriate underground BMP is described in the USDCM, V3 Underground BMP Fact Sheet.

5.0 Alternate BMPs

BMPs not included in the USDCM, V3 may show promise but need further independent research to determine their pollutant removal effectiveness in a semiarid climate and to develop cost-effective design criteria to ensure they are properly designed, constructed, and maintained. Alternate Treatment BMPs may be approved for use through the variance process described in Chapter 1of Volume 1 of this Manual if it can be demonstrated that the proposed BMP meets or exceeds treatment standards for the WQCV or similarly applicable USDCM, V3 Treatment BMPs. Documentation must also include design plans, specifications, and maintenance requirements similar to those provided for the USDCM, V3 Treatment BMPS and signed by a Colorado Professional Engineer.

6.0 Fact Sheets

As mentioned above, this chapter incorporates by reference all criteria presented in the current version of the Urban Storm Drainage Criteria Manual (USDCM), Volume 3, Best Management Practices, Chapter 4 Treatment BMPs for purposes of design and implementation. Treatment BMP Fact Sheets are provided in the USDCM, V3.